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TRANSLATOR'S DECLARATION

I, Walter F. Fasse, having an office at 60G Main Road North, P.O. Box 726, Hampden, Maine, 04444-0726, U.S.A.

solemnly declare:

that I am fully conversant and knowledgeable in the German language to fluently read, write, and speak it, I am also fully conversant and knowledgeable in the English language;

that I have, to the best of my ability, prepared the attached accurate, complete and literal translation of the German language text of:

PCT International Application PCT/DE2004/002807
as filed on December 20, 2004

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: January 20, 2006

Walter F. Fasse
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Device for Testing Cabin Parts of Commercial Aircrafts

The invention relates to an apparatus for the laboratory testing of enclosed partial cabins as a resting room or space for installation in commercial aircraft for an acoustic design and testing.

The acoustic design or layout of enclosed partial cabins within cabin or freight compartment often has to satisfy especially high noise protection requirements for the purpose of the relaxation/sleep of the aircraft crew or passengers. In that regard, the installation location of the partial cabins is frequently fixed or specified in surrounding environments with especially high background or environmental noise levels. Therefore, in the acoustic design of the partial cabin, it depends on taking into account the background or environmental noise about the partial cabin and the noise transmission paths.

It is known to install the partial cabin in an original fuselage section, and to produce a diffuse noise field as an acoustic re-creation of engine jet noise and boundary layer noise outside of the section with the aid of reverberation chambers mounted or built onto the fuselage contour. Thereby, the fuselage section is excited to undergo vibrations, which, on its part, radiates noise in the form of airborne noise and also structure-borne

noise inwardly toward the inside and thus also in the direction of the partial cabin, and thereby acoustically excites the partial cabin.

In that regard, the fuselage section divides the externally applied noise excitation with correct proportions into inwardly directed airborne and structure-borne noise. The structure-borne noise coupling into the partial cabin runs into the fuselage segment with correct intensity and phase due to the original partial cabin installation. Thereby, noise level measurements in the partial cabin are representative, and modifications of the partial cabin for the purpose of noise reduction measures can be designed and tested or measured.

However, this process or manner of proceeding always requires the availability of an original fuselage section, which leads to high costs especially in connection with high capacity aircraft.

It is the object of the invention, to carry out a design and testing of enclosed partial cabins outside of a fuselage section in a simple manner, and thus to make possible a laboratory handling.

The solution to this object is achieved according to the invention in that the partial cabin is arranged via at least one vibration generator for the simulation of an excitation structure-borne noise in the area of connection elements to the fuselage structure, and elements for the airborne noise

excitation are allocated to the partial cabin, whereby the vibration generators for the structure-borne noise and the elements for the airborne noise excitation are adjustable via control and regulating devices, and the signals are generatable via a computer unit with an input data file of knowledge-based data as well as, if applicable, by extrapolation of the acoustic values at the installation location and of the embodiment or construction of the partial cabin.

Hereby a simple computer assisted or supported simulation of the acoustic relationships is made possible, and a plurality of changes and tests can be carried out in a simple manner, without carrying out the corresponding installations of the partial cabin in the fuselage sectors.

It is further suggested that the input data file of knowledge-based data at least the proportions of the various different noise transmissions from analyses of existing installed acoustically-designed partial cabins as well as of the measured values of the present subject relationships in the aircraft with respect to installation locations.

A simple arrangement consists in that an allocated loudspeaker arrangement is controlledly driveable or actuatable for the airborne noise excitation.

Furthermore, it is provided that an allocated loudspeaker arrangement is controlledly driveable or actuatable for the airborne noise excitation.

Alternatively it is suggested that reverberation chambers are arranged directly on the sidewalls of the partial cabin for the airborne noise excitation.

An arrangement according to the invention is schematically illustrated in the drawing.

In this regard, a partial cabin 1 is set-up or erected outside of the aircraft fuselage on the floor 3 of a testing hall via the typically utilized shock absorbers 2.

Piezo vibration generators 4 for the generation of the excitation structure-borne noise are arranged below the shock absorbers 2. In this case, a loudspeaker arrangement 5 is allocated to the partial cabin 1 for the airborne noise excitation.

The elements 4, 5 for the structure-born noise and airborne noise excitation are adjusted via control and regulating devices 6, and are supplied via a computer unit 7.

In that regard, the computer unit 7 is fed or supplied with an input unit 8, which comprises knowledge-based data, and in this regard at least the proportions of the various different noise transmissions from analyses of existing installed

acoustically-designed partial cabins 1. Additionally, measured values of the present subject relationships in the aircraft with respect to the installation location are taken into account.

Through these measures, the correct relationships between excitation airborne noise and excitation structure-borne noise are adjusted, as also for the structure-borne noise excitation, to adjust the vibration components and phases corresponding per excitation point, essentially at low frequencies, at the vibration generators 4.

The informations for the individual proportions of the noise transmission are obtained from analyses of partial cabins that are already acoustically designed and that are installed in an original fuselage section. Through additional measurements in the aircraft as well as an extrapolation of the acoustic relationships on the new design or layout situation, such as a different fuselage, different partial cabin, is taken into consideration with the aid of acoustic simulation and calculation or computation methods (SEA, FEM).